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 [Announcements \(announcements\)](#)
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Unit 13 - Week 11

 [Course outline](#)
 [How to access the portal](#)
 [Pre-requisite Assignment](#)
 [Week 1](#)
 [Week 2](#)
 [Week 3](#)
 [Week 4](#)
 [Week 5](#)
 [Week 6](#)
 [Week 7](#)
 [Week 8](#)
 [Week 9](#)
 [Week 10](#)
 [Week 11](#)

Assignment 11

The due date for submitting this assignment has passed. **Due on 2019-10-16, 23:59 IST.**
As per our records you have not submitted this assignment.

1) An operations research analyst has developed a computer simulation model of a single item **1 point** inventory system. He has experimented with the simulation model to investigate the effect of various reorder quantities on the average annual cost of the inventory. The data are shown below. We know that average annual inventory cost is a convex function of the reorder quantity, we suspect that a second order polynomial model is the highest order model that must be considered.

Polynomial Regression Models (Part A) (unit? unit=64&lesson=65)

Polynomial Regression Models (Part B) (unit? unit=64&lesson=66)

Polynomial Regression Models (Part C) (unit? unit=64&lesson=67)

WEEK 11 - FEEDBACK - Regression analysis (unit? unit=64&lesson=68)

Assignment Solution (unit? unit=64&lesson=69)

Quiz : Assignment 11 (assessment? name=94)

Week 12

VIDEO DOWNLOAD

observation	x (reorder quantity)	y (average annual cost)
1	50	335
2	75	326
3	100	316
4	125	313
5	150	311
6	175	314
7	200	318
8	225	328
9	250	337
10	275	345

Therefore we fit a second order model to this data using orthogonal polynomial:

$$y_i = \alpha_0 + \alpha_1 P_1(x_i) + \alpha_2 P_2(x_i) + \epsilon_i.$$

Here $P_1(x_i) = \lambda_1 \left(\frac{x_i - \bar{x}}{d}\right)$ and $P_2(x_i) = \lambda_2 \left[\left(\frac{x_i - \bar{x}}{d}\right)^2 - \left(\frac{n^2 - 1}{12}\right)\right]$, where d is the spacing between the levels of x and λ_1 and λ_2 are constants chosen so that the $P_1(x_i)$ and $P_2(x_i)$ will have integer values. Here $d = 25$, $n = 10$, $\bar{x} = 162.5$. It is easy to note that, here, $\lambda_1 = 2$ and $\lambda_2 = \frac{1}{2}$. The least square estimate of α_0 is approximately equal to

- 715.66
 324.30
 23.56
 432.11

No, the answer is incorrect.
Score: 0

Accepted Answers:
324.30

2) Consider the data in Problem 1. The least square estimate of α_1 is approximately equal to **1 point**

- 5.3211
 0.7424
 0.0043
 15.6643

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.7424

3) Consider the data in Problem 1. The least square estimate of α_2 is approximately equal to **1 point**

- 3.3213
 0.7424
 2.7995
 1.4532

No, the answer is incorrect.
Score: 0

Accepted Answers:
2.7995

4) Consider the data in Problem 1. SS_{Reg} for the parameter α_1 is approximately equal to **1 point**

- 171.56
- 75.63
- 181.89
- 132.77

No, the answer is incorrect.

Score: 0

Accepted Answers:

181.89

5) Consider the data in Problem 1. SS_{Reg} for the parameter α_2 is approximately equal to **1 point**

- 1031.54
- 1125.63
- 1281.19
- 867.55

No, the answer is incorrect.

Score: 0

Accepted Answers:

1031.54

6) Consider the data in Problem 1. SS_{Res} is approximately equal to **1 point**

- 342.54
- 111.43
- 12.19
- 26.67

No, the answer is incorrect.

Score: 0

Accepted Answers:

26.67

7) Consider the data in Problem 1. Suppose we wish to test the hypothesis $H_0 : \alpha_1 = \alpha_2 = 0$ **1 point** against $H_1 : H_0$ is not true. The value of the F statistic is

- 159.24
- 47.74
- 12.19
- 9.23

No, the answer is incorrect.

Score: 0

Accepted Answers:

159.24

8) Consider the data in Problem 1. Can the second order term be deleted from the fitted equation? **1 point**

- Yes
- No

No, the answer is incorrect.

Score: 0

Accepted Answers:

No

9) Consider the data in Problem 1. Suppose we wish to investigate the addition of a third order term to the model. Comment on the necessity of this additional term **1 point**

- The third order term is necessary
- The third order term is not necessary

No, the answer is incorrect.

Score: 0

Accepted Answers:

The third order term is not necessary